
WELLS HATCHERY

A COMPILATION AND SUMMARY OF
HOT AUDITS FOR SUMMER CHINOOK
AND SUMMER STEELHEAD

JULY 1998

HATCHERY EVALUATION REPORT

- Wells Hatchery**
- **Summer Chinook**
- **Summer Steelhead**

A Summarized Compilation of Independent Audits Based on Integrated Hatchery Operations Team (IHOT) Performance Measures

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Executive Summary

This report compiles a summary of the findings of two separate Hatchery Evaluation Reports for Summer Chinook, and Summer Steelhead at Wells Hatchery. The original Hatchery Evaluation Reports, prepared by Montgomery Watson, presented each species and program separately and include the complete findings. Details on the audit compliance status for each species and program are included in the original reports. The Hatchery Evaluation Reports were based upon audits conducted in 1996-1997 as part of a 2-year effort that will include 67 hatcheries and satellite facilities located on the Columbia and Snake River system in Idaho, Oregon, and Washington. The hatchery operating agencies include the U.S Fish and Wildlife Service, Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife, and Washington Department of Fish and Wildlife.

Wells Hatchery is located along the Columbia River just below Wells Dam and is operated by the Washington Department of Fish and Wildlife. The hatchery is used for adult collection, incubation, and rearing of summer chinook and summer steelhead.

Background

The audit is being conducted as a requirement of the Northwest Power Planning Council (NPPC) "Strategy for Salmon" and the Columbia River Basin Fish and Wildlife Program. Under the audit, the hatcheries are evaluated against policies and related performance measures developed by the Integrated Hatchery Operations Team (IHOT) in January 1995. IHOT is a multi-agency group established by the NPPC to direct the development of new basinwide standards for managing and operating fish hatcheries. The Bonneville Power Administration (BPA) contracted with Montgomery Watson to act as an independent contractor for the audit.

IHOT has established five basic policies that cover: (1) hatchery coordination, (2) hatchery performance standards, (3) fish health, (4) ecological interaction, and (5) genetics. The audit focuses on all these policies, with the exception of hatchery coordination. These policies are set forth in *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1995)*, which is the source for the performance measures that are the basis of this audit.

The Audit Process

The audit was based on the facility management's response to a 109-page questionnaire. This audit form was completed through a five-step process in which:

- Information was obtained from headquarters.
- The hatchery manager was asked to fill out and return the audit form.
- A 1-2 day site audit visit was conducted to inspect facilities, review hatchery records, discuss audit form responses, and develop remedial action plans.

- A compliance report was developed to document the compliance status of each performance measure. This report was then shared with the hatchery manager and IHOT representative.
- This hatchery evaluation report was written to document compliance with IHOT performance measures and develop cost estimates for remedial actions when needed.

Wells Hatchery - Summer Chinook and Summer Steelhead Results

The Wells facility includes one pond for adult holding, 12 concrete raceways, 3 rearing ponds, and incubation facilities. The hatchery is operated as a mitigation facility for fishery impacts caused by the Wells Dam.

Summer Chinook

The Wells Hatchery - Summer Chinook program was in general compliance with many of the performance measures. In the area of program objectives, the hatchery did not have a monitoring and evaluation plan in place, was not meeting its adult return goal, and needed to document many production performance goals. The audit found that the hatchery was not in compliance with the screen approach criteria, water quality monitoring requirements, and pathology-free water criteria, which are all facilities requirements. The hatchery needed to develop specific incubation and rearing standards for the IHOT Operations Plan and a smoltification goal and monitoring plan. The hatchery also exceeded the flow and loading criteria for incubation and density criteria for rearing. In the compliance area for fish health policy, the hatchery did not have foot baths in the incubation facilities. The hatchery did not have a Genetics Monitoring and Evaluation Program in place.

The specific areas in which the Wells Hatchery - Summer Chinook program requires remedial actions based on the IHOT performance measures are listed below. These remedial actions are listed in alphabetical order without intent of ranking or otherwise assigning priority:

- Conduct IHOT QA/QC tests for feed preparation
- Develop specific incubation and rearing standards for the IHOT Operations Plan
- Develop alarm log
- Develop approved genetics monitoring and evaluation program
- Develop smoltification goal and monitor
- Develop training schedule for staff
- Develop written monitoring and evaluation plan for the IHOT Operations Plan
- Document DO and TGP levels
- Document egg take
- Document eyed-egg to fry survival
- Document fry-to-smolt survival
- Document size at release and date of releases
- Document smolt production
- Develop smolt-to-adult survival goal for IHOT
- Document water chemistry parameters, turbidity, alkalinity, hardness, nitrite, and contaminants

- Follow IHOT incubator criteria for loading and flow
- Follow IHOT requirements for daily checking of water flow alarms and weekly checking of other alarms
- Install auto dialer and pages
- Install foot baths in incubation facilities
- Install intake screen that meets the current approach and mesh criteria
- Provide training on broodstock collection procedures
- Review IHOT requirement for disease-free water for rearing
- Review IHOT temperature criteria for rearing
- Revise IHOT release goal to match ESA goal
- Split fish earlier to avoid exceeding density index

Non-compliance issues resulting from items beyond human control or Performance Measures not relevant to this hatchery were not listed above.

Summer Steelhead

The Wells Hatchery - Summer Steelhead program was in general compliance with many of the performance measures. In the area of program objectives, the hatchery did not have a monitoring and evaluation plan in place and needed to document many production performance goals. The audit found that the hatchery was not in compliance with the screen approach criteria, water quality monitoring requirements, and pathology-free water criteria, which are all facilities requirements. The hatchery needs additional rearing space, acclimation ponds, and double screening of raceways. The hatchery needed to develop specific incubation early rearing, and rearing standards for the IHOT Operations Plan and a smoltification goal and monitoring plan. The hatchery was not in compliance with all of the transport and feed handling protocols. The hatchery also exceeded the flow and loading criteria for incubation and density criteria for rearing. The hatchery did not have a Genetics Monitoring and Evaluation Program in place.

The specific areas in which the Wells Hatchery - Summer Steelhead program requires remedial actions based on the IHOT performance measures are listed below. These remedial actions are listed in alphabetical order without intent of ranking or otherwise assigning priority:

- Conduct IHOT QA/QC tests for feed preparation
- Construct 3 acclimation facilities
- Construct new pipeline; analysis needed to determine extent of modifications
- Develop alarm log
- Develop approved genetics M&E program
- Develop smoltification goal and monitor
- Develop specific incubation, early rearing, and rearing standards for the IHOT Operations Plan
- Develop training schedule for staff
- Develop written monitoring and evaluation plan for the IHOT Operations Plan
- Document adult contribution
- Document daily or weekly spawning activities
- Document DO and TGP levels
- Document eyed-egg to fry survival
- Document fry-to-smolt survival
- Document smolt production

- Document smolt-to-adult survival
- Document water chemistry parameters, turbidity, alkalinity, hardness, nitrite, and contaminants
- Follow IHOT incubator criteria for loading and flow
- Follow IHOT protocols for disinfection of exteriors and interiors of transport vehicles
- Follow IHOT requirements for daily checking of water flow alarms and weekly checking of other alarms
- Follow IHOT requirements for reduction of oxygen concentrations to 8 ppm after system is functioning properly
- Follow IHOT temperature criteria for hauling
- Improve green-egg to eyed-egg survival
- Install auto dialer and pages
- Install double screens on 2 ponds
- Install intake screen that meets the current approach and mesh criteria
- Install predator control fencing around earthen ponds and evaluate
- Provide training on broodstock collection procedures
- Review IHOT requirement for disease-free water for rearing
- Review IHOT temperature criteria for rearing
- Review protocols for representativeness of male/female crosses

Non-compliance issues resulting from items beyond human control or Performance Measures not relevant to this hatchery were not listed above.

Facility Description

Name:	Wells Fish Hatchery
Stock/Species:	Summer Chinook Summer Steelhead
Operating Agency:	Washington Department of Fish and Wildlife
Funding Agency:	Douglas County PUD
Location:	Wells Hatchery is located along the Columbia River just below Wells Dam
Address:	Washington Department of Fish and Wildlife HC 88 Azwell RT, Box 2A Pateros, WA 98846
Hatchery Manager:	Mr. Gary Osborne
Phone:	(509) 923-2741
Fax:	(509) 923-2578
Purpose:	The hatchery is operated as a mitigation facility for fishery impacts caused by the Wells Dam. The mitigation agreement with Douglas County PUD requires an annual production of 56,200 pounds of summer steelhead.
Production Goal:	<p>Summer Chinook</p> <p>Produce 320,000 yearling and 484,000 subyearling for on-station releases</p> <p>Trap, hold, and spawn adult summer chinook for transfer of 1,300,000 green eggs to Eastbank Hatchery</p> <p>Provide 2,000 eggs to co-op programs for educational purposes.</p> <p>Summer Steelhead</p> <p>Produce 450,000 smolts for on-station release</p> <p>Produce eyed-eggs for transfer to Eastbank, Chelan, and Winthrop hatcheries</p>
Water Supply:	Average flows available to the hatchery are 78,000 gpm from the

Columbia River and 9,000 gpm from the wells

Facilities:

Adult Holding:	1 concrete adult holding pond - 18,300 cf
Incubation:	46 16 stack vertical incubators (728 trays)
Early Rearing:	42 shallow troughs - 7.2 cf each
Raceways:	8 vinyl coated raceways - 2,700 cf each 4 concrete raceways - 2,250 cf each
Rearing Ponds:	3 concrete rearing ponds, 30,400 cf, 30400 cf, and 25,000 cf
Satellite Facilities:	None

Remedial Actions

Based on the compliance status for each performance measure, remedial actions were developed. The required remedial actions are organized into five categories. The types of categories range across a spectrum from those actions that are beyond human control, to those that require a change in agency policy or procedures, to those that involve a significant capital cost to put in place. The following are the five types of remedial actions identified under phase 1 of the audit:

The Five Types of Remedial Actions

Type	Description
1	Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery
2	Remedial actions requiring changes in agency policies or procedures
3	Remedial actions requiring changes in monitoring coverage or interval
4	Remedial actions requiring significant capital expenditures
5	Remedial actions that may require significant capital expenditures but are not clearly definable at this time

Remedial Actions at Wells Hatchery - Summer Chinook and Summer Steelhead

This section presents the corrective actions required to bring the Wells Hatchery - Summer Chinook and Summer Steelhead programs into compliance with IHOT performance measures. The remedial actions described here are suggestions developed by the Montgomery Watson Audit Team. The remedial actions and associated cost estimates have not been analyzed or prioritized by the respective operating agencies, fishery managers, or IHOT. There may be additional remedial actions, not included in this report, proposed by the respective operating agencies. For some non-compliance areas, other remedial actions could be proposed. The required remedial actions are cross-referenced to each IHOT performance measure that was not in compliance. Where appropriate, the costs associated with the remedial actions are also presented (Table 3a and 3b).

The cost estimates presented in this section are based on professional experience from similar projects. In most cases, only a lump-sum figure is presented, and detailed take-off lists have not been prepared. The cost estimates are essentially order of magnitude estimates ($\pm 40\%$).

The suggested remedial activities may also present several levels of action. Optional actions have been listed for several problems. These optional actions are desirable for either operational or safety considerations.

Table 3a. Remedial Actions Required at Wells Hatchery - Summer Chinook

Remedial Action Required	Cost	PMs¹
Type 1 - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery		
Improve adult returns	----	42
Type 2 - Remedial actions requiring changes in agency policies or procedures		
Develop written monitoring and evaluation plan for the IHOT Operations Plan	----	3
Document egg take	----	4c
Document eyed-egg to fry survival	----	4e
Document fry-to-smolt survival	----	4f
Document smolt production	----	4g
Develop smolt-to-adult survival goal for IHOT	----	4h
Review IHOT criteria for rearing	----	5a
Review IHOT requirement for disease-free water for rearing	----	5h
Develop alarm log	----	6
Follow IHOT requirements for daily checking of water flow alarms and weekly checking of other alarms	----	6
Conduct IHOT QA/QC tests for feed preparation	----	12
Develop specific incubation and rearing standards for the IHOT Operations Plan	----	18-19
Follow IHOT incubator criteria for loading and flow	----	18
Split fish earlier to avoid exceeding density index	----	19

¹ PMs are performance measures that were extracted from the IHOT 1995 report.

Remedial Action Required	Cost	PMS¹
Type 2 (Continued) - Remedial actions requiring changes in agency policies or procedures		
Develop smoltification goal and monitor	----	22a1
Revise IHOT release goal to match ESA goal	----	22a4
Document size at release and date of releases	----	22a5- 22a6
Develop training schedule for staff	----	25
Install foot baths in incubation facilities	----	28
Provide training on broodstock collection procedures	----	41
Develop approved genetics monitoring and evaluation program	----	43
Type 3 - Remedial actions requiring changes in monitoring coverage or interval		
Document DO and TGP levels	----	5b
Document water chemistry parameters, turbidity, alkalinity, hardness, nitrite, and contaminants	----	5c-5g
Type 4 - Remedial actions requiring significant capital expenditures		
Install auto dialer and pagers	\$5,000	6
Install intake screen that meets the current approach and mesh criteria	\$2,000,000	10
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
None	----	

¹ PMS are performance measures that were extracted from the IHOT 1995 report.

Remedial Action Required	Cost	PMS¹
Type 2 (Continued) - Remedial actions requiring changes in agency policies or procedures		
Follow IHOT temperature criteria for hauling	----	23
Develop training schedule for staff	----	25
Provide training on broodstock collection procedures	----	41
Develop approved genetics M&E program	----	43
Document daily or weekly spawning activities	----	42b, 42c
Review protocols for representatives of male/female crosses	----	42g
Type 3 - Remedial actions requiring changes in monitoring coverage or interval		
Document DO and TGP levels	----	5b
Document water chemistry parameters, turbidity, alkalinity, hardness, nitrite, and contaminants	----	5c-5g
Type 4 - Remedial actions requiring significant capital expenditures		
Install auto dialer and pagers	\$5,000	6
Install intake screen that meets the current approach and mesh criteria	\$2,000,000	10
Install double screens on 2 ponds	\$4,500	10
Install predator control fencing around earthen ponds and evaluate	\$41,250	11, 22a4
Construct 3 acclimation facilities	\$3,000,000	22b
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
Improve green-egg to eyed-egg survival	----	4d
Construct new pipeline; analysis needed to determine extent of modifications	----	19

¹ PMS are performance measures that were extracted from the IHOT 1995 report.

Hatchery Contribution to Fisheries, Spawning Grounds, and Hatcheries

This section presents the audit findings for the Wells Hatchery - Summer Chinook and Summer Steelhead programs contribution of adult fish to fisheries, local fisheries, spawning grounds, and hatcheries (Tables 4a and 4b). Data is reported by broodyear. A broodyear refers to the adult contribution from the eggs produced from a single group of spawning adults. For some species, this may include fish caught as 2-, 3-, 4-, 5-, and 6-year old fish. Because of the return distribution and data processing delays, the complete adult contribution for a given broodyear may not be available until 4 to 5 years after the fish have been released from the hatchery.

**Table 4a. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries:
Wells Hatchery - Summer Chinook**

Year	Fisheries ¹ (Broodyear)	Spawning Grounds ¹ (Broodyear)	Hatchery ¹ (Broodyear)	Total Combined Contribution ² (Broodyear)	Smolt to Adult Survival (percent)
1983					
1984					
1985					
1986	693	No information provided	351	1,044	0.27%
1987	419	No information provided	194	613	0.11%
1988	193	No information provided	193	386	0.10%
1989	155	No information provided	95	250	0.16%
1990	31	No information provided	23	54	0.02%
1991					
1992					

¹ Data obtained from Missing Production Groups Annual Report or from the Regional Mark Information System database.

² Total combined adult contribution; presented when it is not possible to subdivide the contribution into fisheries, spawning grounds, and hatchery contributions.

**Table 4b. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries:
Wells Hatchery - Summer Steelhead**

Year	Fisheries¹ (Broodyear)	Spawning Grounds¹ (Broodyear)	Hatchery¹ (Broodyear)	Total Combined Contribution² (Broodyear)	Smolt to Adult Survival (percent)
1983					
1984					
1985					
1986					
1987	No information provided	No information provided	No information provided	No information provided	No information provided
1988	No information provided	No information provided	No information provided	No information provided	No information provided
1989	No information provided	No information provided	No information provided	No information provided	No information provided
1990					
1991					
1992					

¹ Data obtained from Missing Production Groups Annual Report or from the Regional Mark Information System database.

² Total combined adult contribution; presented when it is not possible to subdivide the contribution into fisheries, spawning grounds, and hatchery contributions.

Annual Operating Expenditures

The level and detail of annual operating expenditures varies widely depending on hatchery, operating agency, and funding source. When provided, expenditures were presented in terms of personnel costs, operating costs (power, feed, and supplies), capital costs, indirect costs charged to the federal government, third-party costs, and other costs. These cost components were summed to determine a total hatchery annual cost. Based on discussion with the hatchery manager, the percent of total hatchery costs allocated to a given program was estimated. The total hatchery costs and the percent of hatchery costs allocated to a given program were used to compute the cost of a given program. The total expenditures for the Wells Hatchery are presented in Table 5 by program. The detailed breakdown of program expenditures for Summer Chinook and Summer Steelhead at this hatchery are presented in separate tables (Table 6a and 6b).

Table 5. Annual Operating Expenses - Wells Hatchery

Program	1993	1994	1995
1. Summer Chinook	\$292,905	\$282,424	\$292,500
2. Summer Steelhead	\$358,522	\$345,185	\$357,500
3.			
4.			
5.			
Total Hatchery Costs	\$651,858	\$627,609	\$650,000

**Table 5a. Annual Operating Expenses: Wells Hatchery - Summer Chinook
Expenditure Occurring at Wells Hatchery**

Component	1994	1995	1996
Personnel Costs			
Operational Costs			
Capital Costs			
Indirect Costs			
Lumped Hatchery Costs ¹	\$651,858	\$627,609	\$650,000
Lumped Third-Party Costs			
Total Hatchery Costs	\$651,858	\$627,609	\$650,000
Source of Funds			
Douglas County PUD	100%	100%	100%
Program Production (lb)	61,200	61,200	61,200
Total Production (lb)	136,200	136,200	136,200
Program as Percent of Total	45%	45%	45%
Program Costs	\$292,905	\$282,424	\$292,500

¹ When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

Table 6a. Detailed Expenditures at Wells Hatchery by Program

Summer Chinook

Component	1994	1995	1996
Personnel Costs			
Operational Costs			
Capital Costs			
Indirect Costs			
Lumped Hatchery Costs ¹	\$651,858	\$627,609	\$650,000
Lumped Third-Party Costs			
Total Hatchery Costs	\$651,858	\$627,609	\$650,000
Source of Funds			
Douglas County PUD	100%	100%	100%
Program Production (lb)	61,200	61,200	61,200
Total Production (lb)	136,200	136,200	136,200
Program as Percent of Total	45%	45%	45%
Program Costs	\$292,905	\$282,424	\$292,500

¹ When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

Table 6b. Detailed Expenditures at Wells Hatchery by Program

Summer Steelhead

Component	1994	1995	1996
Personnel Costs			
Operational Costs			
Capital Costs			
Indirect Costs			
Lumped Hatchery Costs ¹	\$651,858	\$627,609	\$650,000
Lumped Third-Party Costs			
Total Hatchery Costs	\$651,858	\$627,609	\$650,000
Source of Funds			
Douglas County PUD	100%	100%	100%
Program Production (lb)	75,000	75,000	75,000
Total Production (lb)	136,200	136,200	136,200
Program as Percent of Total	55%	55%	55%
Program Costs	\$358,522	\$345,185	\$357,500

¹ When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.